

PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

(Chapter II of the Patent Cooperation Treaty)

(PCT Article 36 and Rule 70)

REC'D 18 JUL 2005

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Applicant's or agent's file reference TS 6451 PCT	FOR FURTHER ACTION		See Form PCT/PEA/416
International application No. PCT/EP2004/051428	International filing date (day/month/year) 09.07.2004	Priority date (day/month/year) 09.07.2003	
International Patent Classification (IPC) or national classification and IPC E21B7/18, B24C9/00			
Applicant SHELL INTERNATIONAL RESEARCH MAATSCHAPPIJ BV et al			

1. This report is the international preliminary examination report, established by this International Preliminary Examining Authority under Article 35 and transmitted to the applicant according to Article 36.
2. This REPORT consists of a total of 5 sheets, including this cover sheet.
3. This report is also accompanied by ANNEXES, comprising:
 - a. ☒ sent to the applicant and to the International Bureau) a total of 1 sheets, as follows:
 - ☒ sheets of the description, claims and/or drawings which have been amended and are the basis of this report and/or sheets containing rectifications authorized by this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions).
 - ☐ sheets which supersede earlier sheets, but which this Authority considers contain an amendment that goes beyond the disclosure in the international application as filed, as indicated in item 4 of Box No. I and the Supplemental Box.
 - b. ☐ (sent to the International Bureau only) a total of (Indicate type and number of electronic carrier(s)) , containing a sequence listing and/or tables related thereto, in computer readable form only, as indicated in the Supplemental Box Relating to Sequence Listing (see Section 802 of the Administrative Instructions).

4. This report contains indications relating to the following items:

- ☒ Box No. I Basis of the opinion
- ☐ Box No. II Priority
- ☐ Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- ☐ Box No. IV Lack of unity of invention
- ☒ Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- ☐ Box No. VI Certain documents cited
- ☒ Box No. VII Certain defects in the international application
- ☐ Box No. VIII Certain observations on the international application

Date of submission of the demand 03.05.2005	Date of completion of this report 15.07.2005
Name and mailing address of the International preliminary examining authority:  European Patent Office D-80298 Munich Tel. +49 89 2399 - 0 Tx: 523656 epmu d Fax: +49 89 2399 - 4465	Authorized Officer Bellingacci, F Telephone No. +49 89 2399-2784



**INTERNATIONAL PRELIMINARY REPORT
ON PATENTABILITY**

International application No.
PCT/EP2004/051428

Box No. I Basis of the report

1. With regard to the **language**, this report is based on the international application in the language in which it was filed, unless otherwise indicated under this item.
- ☐ This report is based on translations from the original language into the following language , which is the language of a translation furnished for the purposes of:
- ☐ international search (under Rules 12.3 and 23.1(b))
 - ☐ publication of the international application (under Rule 12.4)
 - ☐ international preliminary examination (under Rules 55.2 and/or 55.3)
2. With regard to the **elements*** of the international application, this report is based on *(replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report):*

Description, Pages

1-17 as originally filed

Claims, Numbers

4(part), 5-7 as originally filed

1-3, 4(part) received on 19.05.2005 with letter of 18.05.2005

Drawings, Sheets

1/5-5/5 as originally filed

- ☐ a sequence listing and/or any related table(s) - see Supplemental Box Relating to Sequence Listing
3. ☐ The amendments have resulted in the cancellation of:
- ☐ the description, pages
 - ☐ the claims, Nos.
 - ☐ the drawings, sheets/figs
 - ☐ the sequence listing (*specify*):
 - ☐ any table(s) related to sequence listing (*specify*):
4. ☐ This report has been established as if (some of) the amendments annexed to this report and listed below had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).
- ☐ the description, pages
 - ☐ the claims, Nos.
 - ☐ the drawings, sheets/figs
 - ☐ the sequence listing (*specify*):
 - ☐ any table(s) related to sequence listing (*specify*):

* If item 4 applies, some or all of these sheets may be marked "superseded."

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Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes: Claims	1-7
	No: Claims	
Inventive step (IS)	Yes: Claims	1-7
	No: Claims	
Industrial applicability (IA)	Yes: Claims	1-7
	No: Claims	

2. Citations and explanations (Rule 70.7):

see separate sheet

Box No. VII Certain defects in the international application

The following defects in the form or contents of the international application have been noted:

see separate sheet

Reference is made to the following document:

D1 = US 6 510 907 A

Re Item V

**Reasoned statement with regard to novelty, inventive step or industrial applicability;
citations and explanations supporting such statement**

V-1 D1, which is considered as the closest prior art, describes a tool for excavating an object (see title), the tool comprising (fig. 1):

- a jetting system (5) arranged to impinge the object to be excavated with a jetted stream of a drilling fluid mixed with abrasive particles (30), the jetting system being provided with at least a mixing chamber (10) with a drilling fluid inlet (12), a second inlet (14) for abrasive particles, and an outlet nozzle (15) for releasing the drilling fluid mixed with the abrasive particles;

- a recirculation system (col. 4, lines 23-26) arranged to recirculate at least some of the abrasive particles from a return stream of the fluid mixed with the abrasive particles downstream impingement of the jet with the object back to the jetting system, whereby the abrasive particles comprise a magnetic material (col. 3, lines 34-40), which recirculation system comprises a separator magnet (16) for separating the abrasive particles from said return stream and for transporting the particles to the second inlet (col. 3, lines 23-33).

The tool according to claim 1 differs from said known tool is that it further comprises

- a piece of magnetic material that is provided in or in the vicinity of the mixing chamber such as to draw part of the magnetic field generated by the separator magnet into the mixing chamber.

The subject-matter of claim 1 is therefore new and the claim meets the corresponding requirement of Art. 33(2) PCT.

V-2 The distinguishing feature of claim 1 makes clear that the claimed tool comprises two magnetic systems: a separator magnet and a further means to direct the field of the separator magnet in a given direction, improving thereby the separation efficiency of the separator magnet. None of the cited documents hints to said solution, and claim 1

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meets therefore the inventive step requirement of Art. 33(3) PCT.

The same conclusion applies also to claim 2-7, as they are formulated as dependant on claim 1.

Re Item VII

Certain defects in the international application

- VII-1 a) The features of the claims are not provided with reference signs placed in parentheses (Rule 6.2(b) PCT).

5/06/2005

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TS 6451 PCT

C L A I M S.

1. Tool for excavating an object, the tool comprising:

- a jetting system arranged to impinge the object to be excavated with a jetted stream of a drilling fluid mixed with abrasive particles, the jetting system being provided with at least a mixing chamber with a drilling fluid inlet, a second inlet for abrasive particles, and an outlet nozzle for releasing the drilling fluid mixed with the abrasive particles;

- a recirculation system arranged to recirculate at least some of the abrasive particles, from a return stream of the fluid mixed with the abrasive particles downstream of the impingement surface of the jet with the object back to the jetting system, whereby the abrasive particles comprise a magnetic material, which recirculation system comprises a separator magnet for separating the abrasive particles from said return stream and for transporting the particles to the second inlet; characterized in that the tool comprises

- a piece of magnetic material that is provided in or in the vicinity of the mixing chamber such as to draw a part of the magnetic field generated by the separator magnet into the mixing chamber.

2. The tool of claim 1, wherein said part of the magnetic field in the mixing chamber is directed essentially transverse to a drilling fluid flow path between the drilling fluid inlet and the outlet nozzle.

3. The tool of claim 1 or 2, wherein the piece of magnetic material is located on the side of the mixing chamber opposite from the second inlet.

4. The tool of any one of claims 1 to 3, wherein the recirculation system comprises a support surface to guide the abrasive particles towards the second inlet, and

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